OFF PUMP CORONARY ARTERY BYPASS (OPCAB) SURGERY

IN LEFT MAIN STEM DISEASE - MIMS EXPERIENC

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Introduction: Recent publications have shown that coronary artery bypass grafting (CABG) surgery is safe and effective in patients with critical Left Main Stem (LMS) stenosis when using off-pump coronary surgery techniques. We reviewed our experience with off-pump coronary artery bypass grafting for patients with left main coronary artery disease over three year period in our institution.

Methods: Nine hundred and twenty five patients underwent open-heart surgery between July 2002 and October 2005 at MIMS, Calicut, Kerala, India. Of these, 803 patients had coronary revascularization. Seventy-one patients underwent bypass grafting for left main coronary artery disease (more than 50% stenosis) without the use of heart lung machine. Critical LMS disease was defined as LMS with stenosis greater than 50%, in line with the definition used by The Society of Thoracic Surgeons Criteria for Emergency Status at the time of Surgery. Patients undergoing CABG along with heart valve replacement, resection of a ventricular aneurysm or other surgical procedures were not included in this category.

!Surgical Techniques

Off-pump CABG was performed consecutively by one surgeon at our institution who has switched the entire coronary revascularisation practice to off-pump surgery. There was no conversion to cardiopulmonary bypass in this series.

All patients were operated through a median sterno approach. Target coronary arteries were stabilized the Guidant Tissue stabilizer and Positioner (or) Oct III+ tissue stabilization system (Medtronic, Minnea MN). Appropriate size (1.25mm to 1.75mm) intracor shunts (Medtronic Clear view Shunt; Medtronic) used in all cases to maintain distal perfusion and to ac a bloodless operative field. Visualization was aided modified blower (Vettath's blower) indigenously desi along with use of warm saline irrigation. Hypothermi prevented by application of a warming blanket ov operating table. Conduits used were left internal th artery and saphenous veins.

Data Collection

Preoperative definitions and data collection were done by methods that have been previously published (1). Data were collected prospectively during the patient's admission as part of routine clinical practice and entered into our cardiac surgery registry (Tables 1 and 2).

Table 1. Preoperative Clinical Data	
Characteristic	Off-Pump (n = 71)
Average age (yr)	62.6yrs
Male	61(85.9%)
Female	10(14.1 %)
Average ejection fraction (%)	52.2 (± 12.5)
Diabetes	32 (52.45%)
Obesity	4 (6.55%)
COPD Smoking	4 10(16.39%)
Hypertension	39 (63.93%)
Angina class II III IV	 19(31.14%) 26(42.6%) 3(4.19%)
Peripheral vascular disease	1 (1.6%)
Recent MI	4(6.55%)
Previous MI Stroke	18(29.50%) 2(3.2%)
Renal dysfunction	3(4.91%)
Hemodynamic instability	4 (6.55%)

Preoperative Data	
Characteristic	Off-Pump (n = 71)
Bypass grafts (average)	
1.	2(3.27%)
2.	19(22.95%)
3.	39(57.37%)
4.	11 (16.39%)
IABP	nil

Myocardial infarction	nil
Inotropic agents postoperatively	nil
Blood Transfusion (average units)	3

LOS (days) 7 days 8-10 days	 64 7
Mortality	
Emergency	2

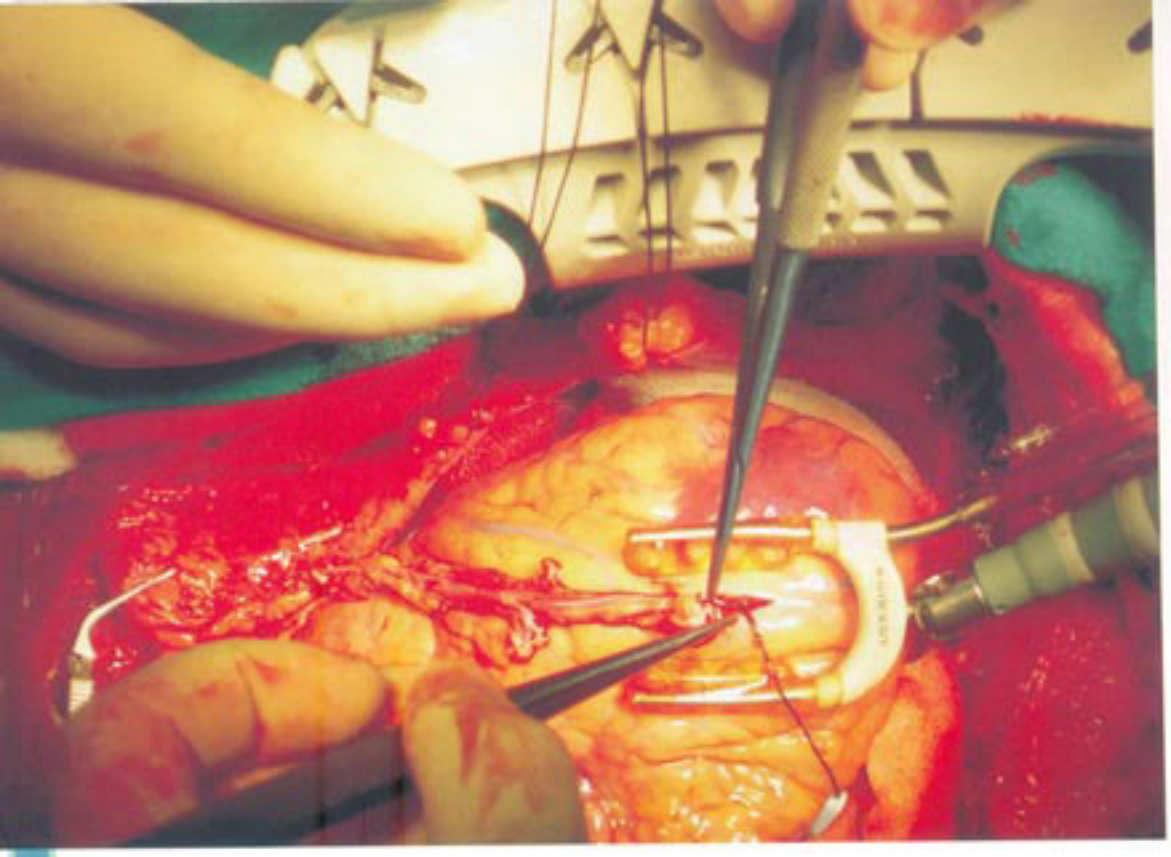

Fig 1: LIMA to LAD grafting on beating heart

Results

In the present analysis, we found that there were 71 patients with significant Left Main disease of which 61 were Male and 10 female patients. The average age was 62.6 yrs and the ejection fraction was more than 40 % in 50 patients. 32 were found to be diabetic and obesity in 4; chronic smokers 10 and 4 had chronic obstructive pulmonary disease; 39 patients were hypertensives on treatment. Angina on exertion class II in 19, Class III in 39 and 11 cases in class IV, one patient had associated peripheral vascular disease. Recent myocardial infarction (two weeks to four weeks) in 4 and previous MI in 18 cases were noted. Two patients had previous history of stroke from which they had no residual deficits at the time of coronary surgery. Renal dysfunction in the form of elevated blood urea and creatinine was found in 3 cases. 13 patients were found to have dyslipedemia. Angiographically LMCA stenosis grade III in 35, grade IV in 15 and grade V (total occlusion) in 11 cases was seen.

During surgery the average number of grafts was 2.87 per patient. Only two cases had single grafts. LITA with saphenous vein grafts were used in all but three cases (only SVGs were used). Intra Aortic balloon pump support was used preoperatively in one and intra operatively in one case (both cases were haemodynamically unstable). No patient had post op IABP, there were no postoperative MI. Inotropic support (Dopamine) was required in only one patient. Postoperative blood transfusion on average was 3 units (to maintain post op Hb 10gms%). Two cases were operated on an emergency basis (taken from the Cath Lab immediately after the angiogram).

Length of stay in the hospital was 7 days in 64 cases and up to 10 days in 7 cases. There were no reexploration for bleeding, no major chest or leg wound complications. There was no mortality (post op death defined as 30 days as per STS criteria).

Discussion

Coronary surgery in patients with significant LMS stenosis is common, and in some institutions can be as high as 30% of activity]. In fact, the proportion of patients with LMS undergoing CABG in our country has been increasing over the last decade This increase in surgical activity is despite the fact that these patients carry an increased risk of in-hospital mortality and morbidity

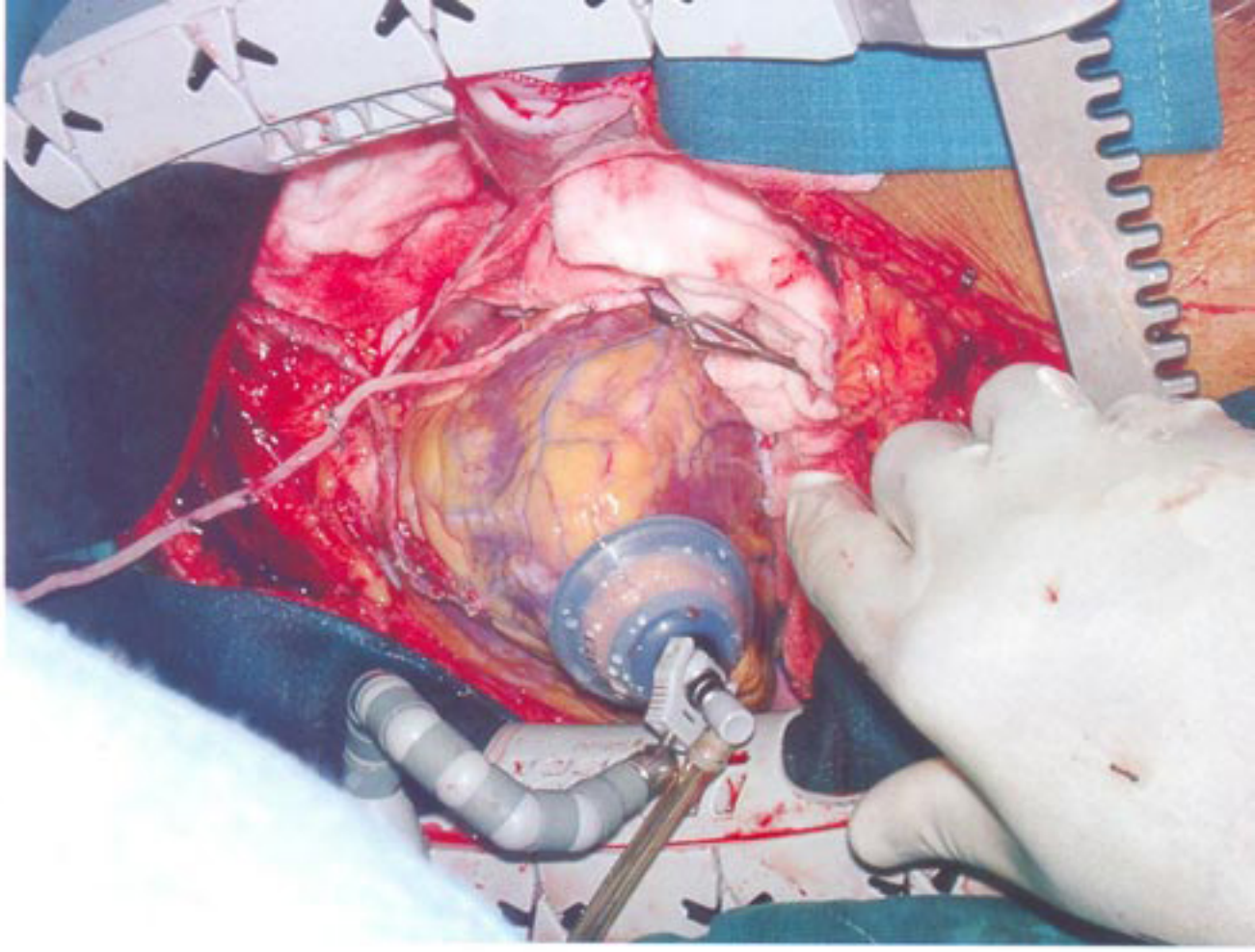

Fig 2: Marginal circumflex artery grafting on beating heart

Significant left main coronary artery stenosis is a standard indication for coronary artery bypass grafting regardless of the patient's presenting symptoms. Numerous studies have identified the presence of left main coronary artery stenosis as an independent predictor of postoperative morbidity and mortality in patients undergoing coronary artery revascularisation (4)

Off-pump bypass grafting continues to be a technique in evolution in many centers around the world. Technically challenging, and with a perceived learning curve, reproducibility of results assumes greater significance in demonstrating the safety and efficacy of this procedure. Once standardized, performing OPCAB in all patients (irrespective of the coronary anatomy and haemodynamics) slated for CABG is possible. This retrospective review of our data substantiates that revascularisation can be performed safely and effectively in patients with left main coronary artery stenosis without the aid of heart lung machine.

Based on these results, we believe that left main coronary artery disease per se is not a contraindication to off-pump revascularization. In fact, we have been able to perform OPCAB in all our patients coming for CABG in our center with negligible mortality rate.

Refernces

1. Wynne-Jones K, Jackson M, Grotte G, et al. Limitations of the Parsonnet score for measuring risk stratified mortality in the north west of England Heart 2000; 84:71-78
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3. Calafiore AM, Di Mauro M, Canosa C, Di Giammarco G, Iaco AL, Contini M. Early and late outcome of myocardial revascularisation with and without cardiopulmonary bypass in high-risk patients EuroSCORE6) Eur J Cardiothorac Surg 2003; 23:360-367.
4. Kennedy J.W., Kaiser G.C., Fisher L.D., et al. Multivariate discriminant analysis of the clinical and angiographic predictors of operative mortality from the Collaborative Study in Coronary Artery Surgery (CASS). J Thorac Cardiovasc Surg 1980; 80:876-887